

CS 1340:Fall 2020:Lecture 02

Intro to Python for CS and Data Science

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- Slack
- Zybooks (hopefully you did the assignment due before class today?)
- Anaconda?

Getting Started

All computer programs have ...

1. Input -

2. Processing -

3. Output -

Drawing with the Turtle

The screenshot shows a Turtle graphics environment. At the top, there are five orange buttons: "Pen up", "Pen down", "Forward", "Turn left", and "Clear". Below these is a vertical list of command blocks on the left, each with a close button (✕): "Pen down", "Forward 100", "Left 120", "Forward 100", "Left 120", and "Forward 100". To the right of this list is a "Run" button. The main canvas area is light gray and contains a blue-outlined equilateral triangle.

1. What's the input?
2. What's the processing?
3. What's the output?

Challenge on your own time ..

Can you draw 'SMU' (block letters of course) with the Turtle?

- Humans don't understand long strings of 1's and 0's
- Computers don't understand

```
print('Hello 1340')
```

So what do we do???

General *Algo* for Programming

1. You write source code in a code editor or IDE (Integrated Development Environment)
2. Save it with a file extension of `.py`. Example: `project01.py`
3. Use the Python interpreter to execute the source code.
 - `python project01.py`
 - OR could be `python3 project01.py`
4. Back to Step 1 to add more code.

Converting Python Code to Machine Code

- Python is an **interpreted** language
 - as your program is running, the Python Interpreter / Runtime is converting source code to machine code one line by line.
 - The alternative is a **compiled** language which converts all the source code to machine code before you run your program.

```
def load_data(filename):
    rows = []
    max_skill_num = 0
    max_num_problems = 0
    with open(filename, "r") as csvfile:
        reader = csv.reader(csvfile, delimiter=',')
        for row in reader:
            rows.append(row)
    index = 0
    print("the number of rows is " + str(len(rows)))
    tuple_rows = []
    while(index < len(rows)-1):
        problems_num = int(rows[index][0])
        tmp_max_skill = max(map(int, rows[index]))
        if(tmp_max_skill > max_skill_num):
            max_skill_num = tmp_max_skill
            if(problems_num == 2):
                index += 3
```

Python Code



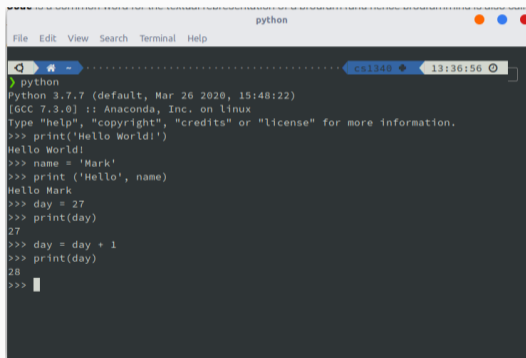
Interpreter

```
001111100000011111001001100011011100101
11101111100001110101111101100011110111
11011110000110001101010010111010011111
1100011011101111101111111111010001111
1111001101101110001111011101011101000
1100110111110110001001000000111011101
111100011110001111111111110011100111
011111011001101111011111010111101111
1111111000111111001010010100011110111
0001111111101100010100001111001000000
101111001111110101011111000101110111
011100001110110111100111110011111111
101110110100001001100110001101110000110
11011001100010101110110100011111010001
1111111001100011100111101010000110100
111010000101100111111000001111011111
1110010011010111111111001111111111111
000000001111110000110011110110010001
010001001111100111111111111001111000
010001110010011111100001011101100110
```

Binary Code

Interactive Python

- `python somescript.py` - runs the code inside `somescript.py`
- `python` - Starts the **interactive interpreter**
 - each line of code is interpreted right after you type it.



```
python
File Edit View Search Terminal Help
cs1349 13:36:56
> python
Python 3.7.7 (default, Mar 26 2020, 15:48:22)
[GCC 7.3.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print('Hello World!')
Hello World!
>>> name = 'Mark'
>>> print('Hello', name)
Hello Mark
>>> day = 27
>>> print(day)
27
>>> day = day + 1
>>> print(day)
28
>>> 
```

- **statement** -
- **variable** -
- **expression** -
- **assignment** -

Some Python Code

```
def advance_cars():
    """Calculate new positions of the cars"""
    global car1_speed, car1_location
    global car2_speed, car2_location
    car1_speed += car1_acceleration
    car1_speed = car1_top_speed if car1_speed > car1_top_speed else car1_speed
    car1_location += car1_speed

    car2_speed += car2_acceleration
    car2_speed = car2_top_speed if car2_speed > car2_top_speed else car2_speed
    car2_location += car2_speed
```

```
print(...)
```

- Notice:
 - printed in mono-spaced font
 - ... means other stuff will be put there
 - () indicate a method or function call

```
print('Hello')
```

```
print('World')
```

```
print('Hello World')
```

'Hello', 'World' are called **string literals**.

```
print(...)
```

```
name = 'Mark'  
print(name)
```

- You can print **string literals** OR values contained in variables.
- What is the variable in this example?

```
print('Hello', end='')  
print('World', end='')
```

- What will this print?

Can you do it?

Use print statements to draw a diamond shape.

Use print statements to draw a heart shape.